METHOD AND APPARATUS FOR MODIFYING AND CONTROLLING PRINT INFORMATION

Field of the Invention

The present invention relates generally to printing, and more specifically to the modification and control of print information of printable information units.

Background of the Invention

With the innovation of word processing and email applications that are able to display text in a wide spectrum of colors, application users are able to demarcate or highlight specific printable information units (e.g., words, paragraphs, figures and drawings) of a particular document or message. Moreover, in some of the current applications, these printable information units default to being color for certain documents and messages. One example is for reply messages on the email application, Microsoft® Outlook, where the default color of the reply text is blue.

Additionally, color printers allow the users of these applications to not only display but also print in color. However, at times, an application user may want to print these colored fields in black and white. Under today's systems, application users are provided the option of printing in black and white those documents that are colored. However, a disadvantage of these systems are that the users are limited to either printing the entire document or message in color or in black and white. This problem leads to over usage of colored inks of colored printers for text that is not needed or required to be printed in color. Returning to the example above concerning Microsoft® Outlook where the default color for reply messages is blue, inevitably, application users who print reply messages from this application on colored printers would run dry the blue color of the colored printer more quickly and unnecessarily than the other colors of the colored printer. Accordingly, it would be

desirable to improve the current system of displaying and printing of colored text in a document or message.

Summary of the Invention

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The above-mentioned shortcomings, disadvantages and problems are addressed by embodiments of the present invention, which will be understood by reading and studying the following specification. The invention describes methods and apparatuses for modifying and controlling print information. In one

10 embodiment, a color designation for a subset of printable information units is overridden for printing. Examples of printable information units include, but are not limited to, words, text, figures and drawings in a document and/or file on a computer system. In one implementation, the color designation is changed from non-black to black. The printable information units are then printed. In additional embodiments,

15 the overriding of the color designation is based on user input and non-user input.

In an alternative embodiment, printable information units are displayed, wherein a subset of the printable information units are of a first color designation. The first color designation for this subset is then changed to a second color designation for printing. The printable information units are then sent to a printer to

20 be printed. In another embodiment, a color of a subset of a plurality of displayed text is designated for display. The color of the subset is changed for printing. The plurality of displayed text is then sent to a printer. In yet a further embodiment, a print code is attached to a subset of printable information units, such that the print code precludes the printing of the subset. The printable information units are then

25 sent to a printer to be printed.

Still other and further aspects and embodiments of the present invention will become apparent by reference to the drawings and by reading the following detailed description.

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Brief Description of the Drawings

Figure 1 is a flowchart of a method for modifying the print colors according to one embodiment of the present invention.

Figure 2 illustrates one embodiment of the present invention used in conjunction with a word processing document.

Figure 3 illustrates another embodiment of the present invention used in conjunction with a word processing document.

Figure 4 is a flowchart of a method for modifying the print colors according to another embodiment of the present invention.

Figure 5 is a flowchart of a method for modifying the print colors according to another embodiment of the present invention.

Figure 6 is a block diagram illustrating the major components of a system embodiment of the present invention.

Figure 7 is a block diagram illustrating the major components of another system embodiment of the present invention.

Figure 8 is a block diagram illustrating the major components of another system embodiment of the present invention.

Figure 9 is a block perspective diagram of a computer system embodiment of the present invention.

Description of Embodiments

The invention includes systems, methods, computers, and computer-readable media of varying scope. Besides the embodiments, advantages and aspects of the invention described here, the invention also includes other embodiments, advantages and aspects, as will become apparent by reading and studying the drawings and the following description.

In the following detailed description of the exemplary embodiments, reference is made to the accompanying drawings that form a part hereof, and in

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which are shown by way of illustration specific embodiments in which the invention may be practiced. It is to be understood that other embodiments may be utilized and structural changes may be made without departing from the scope of the present invention.

Some portions of the detailed descriptions which follow are presented in terms of algorithms and symbolic representations of operations on data bits within a computer memory. These algorithmic descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like. It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the following discussions, it is appreciated that throughout the present invention, discussions utilizing terms such as "processing" or "computing" or "calculating" or "determining" or "displaying" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

Figures 1, 4 and 5 are flowcharts of methods in accordance with embodiments of the invention. The methods are realized at least in part as one or more programs running on a computer -- that is, as a program executed from a

computer-readable medium such as a memory by a processor of a computer. The programs are desirably storable on a computer-readable medium such as a floppy disk, a Compact Disk-Read Only Memory (CD-ROM), for distribution and installation and execution on another (suitably equipped) computer. Additionally, each of the blocks or combinations of blocks in Figures 1, 4 and 5 describe functionality that may be implemented in one or more software modules which can easily be written by one skilled in the art with reference to the flowcharts:

In Figure 1, in block 102, a color designation for printing of a subset of a plurality of printable information units is overridden. In one embodiment, a subset of the plurality of printable information units is defined as less than all of the printable information units. In another embodiment, a color designation is a code assigned to a printable information unit that defines its color for both display and print. In one embodiment, the plurality of printable information units are words. Additionally, the embodiments of the present invention are such that it is anticipated that the printable information units could be portions of a markup language (e.g., HTML (Hypertext Markup Language). In block 104, the plurality of printable information units are printed, including those units whose color designation has been overridden for printing.

For example, the printable information units could be words within a word processing document with each one having a color designation such that portions of the document are displayed in different colors. One such embodiment is illustrated in Figure 2. In particular, Figure 2 illustrates one embodiment wherein the printable information units are words located in a word processing document. Figure 2 includes a number of printable information units including the word "Gateway" (i.e., blue unit 202) displaying in a blue color, "premier" (i.e., green unit 204) and "PC" (i.e., green unit 206) both displaying in a green color. In an alternative embodiment, the plurality of printable information units are groups of words, for example an entire paragraph within a document. In another embodiment, the printable information unit is a figure or drawing. However, it is important to appreciate that the plurality of printable information units is not limited to any particular type of unit.

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In one embodiment, the color designation for printing of the subset of the plurality of printable information units is overridden by changing a non-black color designation to a black color designation. Advantageously, this embodiment reserves the colored inks of printers for those printable information units that the computer user desires to be printed in colored ink, while not wasting colored ink on those portions of the document that need not be printed in color. In another embodiment, the plurality of printable information units are located in a file. In an alternative embodiment, the plurality of printable information units are located in a word processing document. This functionality for overriding of a color designation is such that it anticipates being located not only in a system or computer but also in a printer server or the printer itself.

Figure 3 illustrates a further embodiment of the present invention built on the embodiment of Figure 2. In particular, the overriding of the color designation is based on user input. In this example, assume that a computer user desires that the word "Gateway" be printed in the blue color but desires that "premier" and "PC" be printed in black (not the green color in which they are displayed) in order to preserve the colored inks of the printer. The computer user would label "premier" and "PC" as having this characteristic of displaying in one color and printing in a different color. In particular, Figure 3 illustrates a word processing document being edited by a typical word processing application (e.g., Microsoft® Word) that incorporates one embodiment of the present invention. Figure 3 includes the typical buttons 302-312 that allow the computer user to edit the word processing document. In particular, buttons 302-306 allow for modification of the font, size or color of the text, respectively. Moreover, buttons 308-312 allow for text to be in bold, italicized and underlined, respectively. Additionally, Figure 3 includes button 314 which allows the computer user to specify that certain text be displayed in one color while being printed in a different color. For example, the computer user could label green fields 204-206 using button 314. Accordingly, green fields 204-206 would still be displayed in green but be printed in a different color (e.g., black), while also allowing blue field 202 to still be printed out in blue.

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In one embodiment, this different print color is based on a user-defined setting. For example, button 314 could be set such that the user wants all text in the document associated with button 314 to be printed in black, even though the text still displays in a different color. In one embodiment, the identification of those printable information units that are displayed in one color but printed in a different color (e.g., those units associated with button 314) are identifiable to the user during normal text editing mode of the word processing application. In an alternative embodiment, identification of these printable information units to the user are displayed in a non-normal text mode (e.g., a print preview mode). In other words, the identification of these units is transparent to the user during normal text editing mode.

Advantageously, this invention displays in one color and prints in a different color for a specific printable information unit, thereby preserving the colored ink resources of a colored printer for only those fields that the user desires to print in color. Accordingly, in contrast to the prior art, the computer user is not confined to the choice of printing the entire document in black and white or printing the entire document in the displayed colors. Rather, specific printable information units can be displayed in one color and printed in a different color, independent of the other print information units.

In one embodiment, overriding of a color designation for printing of a subset of the plurality of printable information units is based on non-user input. In one such embodiment, the overriding of a color designation is based on a user and/or a group identification. For example, the color designation of the footnotes within a word processing document are overridden based on the group identification of the user. In one such example, for all engineers the display color is black. However, for software engineers, the print color is blue, while for hardware engineers, the print is green.

Additionally, other embodiments of the present invention could be used in conjunction with security issues. In one embodiment, the subset of the plurality of printable information units, whose color designation is overridden for printing, are portions of a document, such that these portions allow the document to be identified as a copy. In one such embodiment, this subset, whose color designation is

overridden, is the header information or company logo that is displayed in color but is defined such that it is printed in black. Advantageously, this embodiment allows for the distinguishing between an original and a printed-out version, such that the header information and/or company logo is in color for the original version but in black for the printed-out version. Such embodiment could be implemented in a system that restricts access to the modification of this subset. For example, only certain individuals would have password accessability to allow for modification of the display and print colors of the header information and/or company logo. Accordingly, this type of system would preclude unauthorized individuals from printing out a version of the document where the header information and/or company logo are in color.

Another embodiment of the present invention that can be used in conjunction with issues of security and confidentiality allows a plurality of printable information units to be displayed but only allows a portion of these units to be printed. In one such embodiment for printing a plurality of printable information units, a print code is attached to a subset of the plurality of printable information units. This print code precludes the printing out of the subset. In another such embodiment, the print color may be set to "white", thereby preserving spacing but not printing sensitive information. Either embodiment includes the sending of the plurality of printable information units to a printer. Therefore, only the plurality of printable information units are printed even though all of the units could be displayed. For example, if a computer user desires to write a document such that a portion is confidential, the computer user could identify or label the material in the document that is confidential (i.e., the subset of the printable information units), as illustrated in Figure 3. Accordingly, this portion of the document would still be displayed but would not be printed out when the document is printed. Advantageously, this embodiment allows the computer user to incorporate confidential information into documents, while printing out only those portions of the document that are nonconfidential.

Figure 4 is a flowchart of a method in accordance with another embodiment of the invention. In block 402, a plurality of printable information units are

displayed, for example on a display device (e.g., a computer monitor) of a computer. A subset within the plurality of printable information units is of a first color designation. In one embodiment, the plurality of printable information units are located within a file on a computer system. In an alternative embodiment, the plurality of printable information units are located within a word processing document.

In block 404, the first color designation for the subset is changed to a second color designation for printing. In one embodiment, the first color designation for the subset of the plurality of printable information units is a non-black color designation. In another embodiment, the second color designation for the subset is a black color designation. In one embodiment, the first color designation of the subset is changed to a second color designation for printing based on user input, one such example having been described above in conjunction with Figure 3. In an alternative embodiment, the first color designation of the subset is changed to a second color designation for printing based on non-user input. In one such embodiment, the changing of the color designation is based on a user and/or a group identification. In block 406, the plurality of printable information units are sent to a printer to be printed.

Figure 5 is a flowchart of a method in accordance with another embodiment of the invention. In block 502, a color of a subset of a plurality of displayed text for display is designated. In one embodiment, the plurality of displayed text are located within a file on a computer system. In an alternative embodiment, the plurality of displayed text are located within a word processing document.

In block 504, the color of the subset is changed for printing to allow the subset to be displayed in one color and be printed in a different color. In one embodiment, the color of the subset is changed for printing by changing the color from non-black to black. In another embodiment, the color of the subset is changed for printing based on user input, while in an alternative embodiment, this change is based on non-user input. In one embodiment where the change is based on non-user input, the change is based on a user and/or group identification for a particular user.

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In another embodiment where the change is based on non-user input, the change is based upon processing of a particular form of text input; for example, in Microsoft® Outlook, the text in a mail message responding to earlier mail may default to text that is displayed as blue but prints as black. In block 506, the plurality of displayed text that includes the subset, whose color was changed for printing, is sent to a printer. Examples of the method according to Figure 5 are described above in conjunction with Figures 2-3.

Referring to Figure 6, a block diagram according to one embodiment of a system of the present invention is shown. The system of Figure 6 includes override module 602 and printer 604. In one embodiment, override module 602 is part of a computer, although the invention is not so limited. In such an embodiment, override module 602 is a computer program (e.g., an override program) executed by a processor of the computer from a computer-readable medium such as a memory thereof. Additionally, in other embodiments, override module 602 is anticipated being located not only in a system or computer but also in a printer server or the printer itself (e.g., printer 604).

Override module 602 receives a plurality of printable information units with each one of the units having a color designation. Override module 602 overrides the color designation for printing of a subset of the plurality of printable information units. In one embodiment, a subset of the plurality of printable information units is defined as less than all of the printable information units. In another embodiment, a color designation is a code assigned to a printable information unit that defines its color for both display and print. In one embodiment, the plurality of printable information units are words. For example, the printable information units could be words within a word processing document with each one having a color designation such that portions of the document are in different colors, as illustrated and described above in conjunction with Figure 2. Moreover, the embodiments of the present invention are such that it is anticipated that the printable information units could be portions of a markup language (e.g., HTML (Hypertext Markup Language).

In one embodiment, override module 602 overrides the color designation for

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printing of a subset of the plurality of printable information units based on user input, as illustrated and described above in conjunction with Figure 3. In one embodiment, this different print color is based on a user-defined setting. In another embodiment, identification of those printable information units that are displayed in one color but printed in a different color is displayed in the normal text editing mode of the word processing application. In an alternative embodiment, identification of these printable information units to the computer user are displayed in a non-normal text mode (e.g., a print preview mode).

In one embodiment, override module 602 overrides a color designation for printing of a subset of the plurality of printable information units based on non-user input. In one such embodiment, the overriding of a color designation is based on a user and/or a group identification. For example, the color designation of the footnotes within a word processing document are overridden based on the group identification of the user.

The system of Figure 6 also includes printer 604 that is operatively coupled to override module 602. Printer 604 receives and prints the plurality of printable information units. Other embodiments of the system of Figure 6 could be used with issues of security and confidentiality, as previously described above in conjunction with method embodiments of the present invention.

Additionally, in one embodiment, override module 602 overrides the color designation for printing of the subset of the plurality of printable information units by changing a non-black color designation to a black color designation. Advantageously, this embodiment reserves the colored inks of printers for those printable information units that the computer user desires to be printed in colored ink, while not wasting colored ink on those portions of the document that need not be printed in color. In another embodiment, the plurality of printable information units are located in a file. In an alternative embodiment, the plurality of printable information units are located in a word processing document.

Referring next to Figure 7, a block diagram according to another embodiment of a system of the present invention is shown. The system of Figure 7 includes

computer 700, display device 702, override module 704 and printer 706. In one
embodiment, override module 704 is part of computer 700, although the invention is
not so limited. In such an embodiment, override module 704 is a computer program
(e.g., an override program) executed by a processor of computer 700 from a
computer-readable medium such as a memory thereof.

Display device 702 receives and displays a plurality of printable information
units. An embodiment of display device 702 includes a computer monitor. A subset
in the plurality of printable information units is a first color designation. The system
of Figure 7 also includes override module 704 that is operatively coupled to display
device 702. Override module 704 receives the plurality of printable information
units and changes the first color designation of the subset to a second color
designation for printing, as previously described in conjunction with override module
602 of Figure 6.

Additionally, the system of Figure 7 includes printer 706 that is operatively
coupled to override module 704. Printer 706 receives and prints the plurality of
printable information units, as previously described in conjunction with printer 604
of Figure 6.

Referring next to Figure 8, a block diagram according to an embodiment of a
computer system of the present invention is shown. The system of Figure 8 includes
computer 802, display device 804 and override module 806. In one embodiment,
override module 806 is part of computer 802, although the invention is not so
limited. In such an embodiment, override module 806 is a computer program (e.g., a
override program) executed by a processor of computer 802 from a computer-
readable medium such as a memory thereof.

Computer 802 has a plurality of printable information units. These plurality
of printable information units include a subset that have a first color designation. In
one embodiment, the plurality of printable information units are included in a file or
word processing document, as described above. The system of Figure 8 also
includes display device 804 that is operatively coupled to computer 802. Display
device 804 is capable of displaying the printable information units.

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Additionally, the system of Figure 8 includes override module 806 located in computer 802. Override module 806 includes machine readable instruction that cause computer 802 to change the first color designation of the subset of the plurality of printable information units to a different color designation for printing, as previously described in conjunction with override module 602 of Figure 6. In one embodiment, the system of Figure 8 also includes a printer that is operatively coupled to computer 802 and display device 804. This printer is capable of printing the plurality of printable information units, as previously described in conjunction with printer 604 of Figure 6.

Personal computers, as shown in Figure 9, typically include a monitor 900, keyboard input 902, central processing unit 904, and a pointing or selection device such as mouse 905. Further components of a typical computer system may include a machine readable storage media such as disk drive 906, hard disk, CD-ROM 908, DVD, modem, and the like. The processor unit of such a computer typically includes a microprocessor, memory (RAM and ROM), and other peripheral circuitry, not shown.

Method and apparatus embodiments of the present invention comprise computer programs written for the modification of print information of printable information units as shown in Figure 9. The computer programs run on the central processing unit 904 out of main memory, and may be transferred to main memory from permanent storage via disk drive 906 when stored on removable media or via a network connection or modem connection when stored outside of the personal computer, or via other types of computer or machine readable medium from which it can be read and utilized. The computer programs comprise multiple modules or objects to perform the method embodiments of the present invention, or the functions of the modules in the apparatus embodiments of the present invention. The type of computer programming languages used to write the code may vary between procedural code type languages to object oriented languages. The files or objects need not have a one to one correspondence to the modules or method steps described depending on the desires of the programmer. Further, the method and apparatus may

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comprise combinations of software, hardware and firmware as is well known to those skilled in the art.

Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiments shown. This application is intended to cover any adaptations or variations of the invention. It is intended that this invention be limited only by the following claims, and the full scope of equivalents thereof.